

CHAPTER 7

LESSON OUTLINES FOR MATERIAL HANDLING CRANE
AND SELF RECOVERY WINCH OPERATIONS

LESSON TITLE: OPERATE AN M977 HEMTT CRANE

TASK NUMBER: 551-721-1407 (Operate a Crane on an M977 HEMTT) and 551-721-1352
(Perform Vehicle Preventive Maintenance Checks and Services [PMCS])

A. TRAINING OBJECTIVE.

TASK: Operate and perform operator PMCS on the M977 HEMTT crane.

CONDITION: Given instruction, a suitable training area, an M977 HEMTT with BII, several palletized loads of differing weights, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, and a requirement to inspect the truck crane components according to the PMCS tables listed in TM 9-2320-279-10-1 and to operate the crane using both manual and remote controls; prepare the crane for use, set up the outriggers, raise the boom to its operating position, rotate and telescope the boom, load/off load palletized cargo, shut down the crane, and stow the outriggers.

STANDARDS: Without causing damage to the HEMTT or injury to personnel, operate the crane in the correct sequence in accordance with TM 9-2320-279-10-1. Correct all faults within the operator's level of maintenance and record all others legibly on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404. Students will be graded on a GO/NO-GO basis. See enclosed training evaluation checklist.

B. INTERMEDIATE TRAINING.

Intermediate Training Objective 1

TASK: Operate the crane on the M977 HEMTT.

CONDITION: Given instruction, a suitable training area, an M977 HEMTT with BII, several palletized loads of differing weights, and a requirement to operate the crane using both manual and remote controls; prepare the crane for use, set up the outriggers, raise the boom to its operating position, rotate and telescope the boom, load and off load the vehicle, shut down the crane, and stow the outriggers.

STANDARDS: Without causing damage to the HEMTT or injury to personnel, operate the crane in the correct sequence in accordance with TM 9-2320-279-10-1. Students will be graded on a GO/NO-GO basis. See enclosed training evaluation checklist.

Intermediate Training Objective 2

TASK: Perform operator PMCS on the M977 HEMTT crane.

CONDITION: Given instruction, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, an M977 HEMTT with BII, and a requirement to inspect the truck crane components according to the PMCS tables listed in TM 9-2320-279-10-1.

STANDARDS: Correct all faults within the operator's level of maintenance and record all others legibly on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Classroom and training area as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Students: Scheduled personnel.

5. Principal and assistant instructors required: One primary instructor for the conference and one assistant instructor for each two students for the demonstration and practical exercise.

6. Training aids and equipment: Television, VCR, overhead projector, transparencies (see Appendix A), and TVT 55-25. Hearing protection and work gloves are required for all personnel. DA Form 2404, pencil, rags, TM 9-2320-279-10-1, equipment records folder, an M977 HEMTT with BII, and several palletized loads of differing weights for every two students.

7. References: AR 385-55, DA Pamphlet 738-750, and TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures:
 - (1) Explanation and demonstration.
 - (2) Practical exercise.
 - (3) Summary.

2. Explanation and demonstration:

NOTE: The classroom must be near the training area where crane operations are to be practiced. This allows the student to view the videotape and put into practical application these operational procedures with a minimum loss of learned skills. Explain safety precautions and warnings, followed by the videotape, and then demonstrate loading, off loading, and PMCS. PMCS on the crane is performed after operation.

- a. Explain all safety precautions for this exercise and review warnings. Attention should be drawn to all warnings in the vehicle operator's manual with particular attention given the following:

Transparency HEMTT 4-1

WARNING

Do not operate the crane unless both outriggers are set up. Vehicle could turn over causing serious injury or death.

WARNING

Keep hands and body away from the outrigger beams while operating the outrigger extension lever or injury could result when the beams come out.

WARNING

Be careful when removing the outrigger pads from their stowed position. Sharp edges can injure the hands.

WARNING

When lowering the outrigger jack cylinders, keep hands and feet clear of the cylinders to avoid injury.

WARNING

Do not raise the vehicle tires off the ground with the outrigger jack cylinders. The vehicle could roll causing serious injury or death.

WARNING

The crane must be level from side to side. Use of the crane in an unlevel position can cause the vehicle to tip over causing possible serious injury or death.

WARNING

Operate the crane from the forward or rear remote control station if the operator will not be able to see the load at all times during crane operation. Failure to control the boom while it is moving could cause serious injury or death.

Transparency HEMTT 4-2

WARNING

Keep the boom clear of all electrical lines and other obstacles while operating the crane. Serious injury or death could result upon contact.

WARNING

Be sure that the area is clear of personnel before moving the swing control lever. The boom should be swung slowly enough so the crane operator has complete control. If the operator cannot see the load during operation, operate the crane from the remote control unit. Failure to control the boom while it is moving could cause serious injury or death.

WARNING

The operator must keep control of the load at all times. If necessary, attach cargo tiedowns to the load for use as a control tether. Failure to control the load while it is moving could cause serious injury or death.

WARNING

Make sure the remote control on/off/MHC-shutdown power switch is in the off position before connecting the remote control unit. A crane moving out of control could cause serious injury or death.

WARNING

Be sure there are at least two wraps of cable on the hoist drum at all times. Serious injury or death could result if the cable comes off the hoist drum while lifting a load.

Transparency HEMTT 4-3

WARNING

The operator should use the remote control unit in a position that the load will not pass overhead. The load could fall causing serious injury or death.

WARNING

If the electrical power fails during crane operation, move the switch on the remote control unit to the shutdown position. Serious injury could result from uncontrolled moving parts.

b. Show TVT 55-25.

c. Demonstrate loading/off loading the load from the truck using the HEMTT crane with both manual and remote controls and crane PMCS. Diagram of area for crane operation is at Figure 5-8.

3. Practical exercise:

a. Assign students to vehicles and crane operation area. Issue work gloves, TM 9-2320-279-10-1, pencils, DA Form 2404, and equipment records folder. Tell students where rags are located.

b. Students practice operating the crane to load/off load palletized cargo to and from the HEMTT. PMCS of the crane is also performed at this time.

NOTE: Do not allow the students to perform any unsafe acts. Crane operations must be closely supervised because of the potential for injury or death.

4. Evaluate: Check each student's performance of crane operations to include PMCS.

5. Summary:

- a. Recap main points.
- b. Allow for questions.
- c. Clarify questions.
- d. Closing statement.

6. Retraining: Retrain NO-GOs and slow learners. All students must receive a GO in all areas of the attached training evaluation checklist.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when vehicles are parked or maintenance is to be performed.
2. Ensure the transmission is in N, the parking brake is set, and the engine is shut off before leaving the vehicle, when the vehicle is parked, or maintenance is being performed.
3. Ensure all personnel remove all wristwatches, rings, bracelets, neck chains, and any other jewelry before working in or around the HEMTT.
4. Ensure all personnel pay particular attention to the cautions and warnings listed in the operator's manuals.
5. Ensure the driver and ground guides know and understand the hand and arm signals, especially the signal to stop, as outlined in FM 21-305.
6. Ensure ground guide(s) are used when backing.
7. Ensure all backing is conducted at a speed of 5 MPH or less.
8. Do not park the vehicle on a steep grade. Serious injury or death can result.
9. Ensure all personnel wear hearing protection when working in or around a running HEMTT.
10. Ensure all occupants wear seat belts while the vehicle is in operation.
11. Ensure personnel maintain at least three points of contact when mounting or dismounting the vehicle (to include performing PMCS).
12. The vehicle access ladder must be used when performing maintenance. The two hooks on the ladder must be installed in the front skid plate holes, right front fender holes, or left front fender holes as required. When installing the access ladder on the right front fender, do not hit the fuel-water separator. Hitting the fuel-water separator could cause the glass to break.
13. Ensure all personnel are clear of the vehicle before engine start is attempted. Operator must visually check to see that all areas of the truck are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.
14. Always place the transmission in N and set the parking brake before operating the crane.
15. Always wear heavy work gloves when handling cable. Never let the cable run through your hands. A frayed cable may cut you severely.
16. Position the vehicle on level ground if possible. If the ground is not level, the outriggers can be used to level the vehicle from side to side on up to a 5 degree side slope.
17. Be careful when handling the outrigger pads. Sharp edges can injure hands.
18. Keep hands and body away from outrigger beams while operating the outrigger extension lever or injury could result when the beams come out.
19. When lowering the outrigger jack cylinders, keep hands and feet clear of the cylinders to avoid injury.

20. Outrigger cylinders must be extended to remove enough weight from the suspension so that the tires do not bulge, or the vehicle could roll over, causing serious injury or death.

21. Do not operate the crane unless both outriggers are set up. The vehicle could turn over causing serious injury or death.

22. Do not raise the vehicle tires off the ground with the outrigger jack cylinders. The vehicle could roll causing serious injury or death.

23. Keep the boom clear of all electrical lines and other obstacles while operating the crane. Serious injury or death could result upon contact.

24. The operator should be stationed to be able to see the load at all times during crane operation. Operate the crane from the forward or rear remote control station if the load is not visible from the main crane control panel. Failure to control the boom and load while moving could cause serious injury or death.

25. The operator must keep control of the load at all times. If necessary, attach cargo tiedowns to the load for use as a control tether. Failure to control the load could cause serious injury or death.

26. Be sure that the area is clear of personnel before moving the swing control lever. The boom should be swung slowly enough so the crane operator has complete control. If the operator cannot see the load during operation, operate the crane from the remote control unit. Failure to control the boom while it is moving could cause serious injury or death.

27. Be sure there are at least two wraps of cable on the hoist drum at all times. Serious injury or death could result if the cable comes off the hoist drum while lifting a load.

28. Make sure the remote control on/off/MHC-shutdown power switch is in the off position before connecting the remote control unit. The crane moving out of control could cause serious injury or death.

29. If electrical power fails during crane operation, move the switch on the remote control unit to the shutdown position. Serious injury could result from uncontrolled moving parts.

30. The crane must be level from side to side. Use of the crane in an unlevel position can cause the vehicle to tip over causing serious injury or death.

31. The operator should use the remote control unit in a position that the load will not pass overhead. The load could fall causing serious injury or death.

32. When operating two control levers at the same time, if one function is held wide open and “dead-headed” (such as cylinder is fully extended) and another function is operated, the second function can operate at a greater than normal speed, which can cause loss of control and serious injury or death to personnel.

F. **ADDITIONAL COMMENTS AND INFORMATION.** Recommended instructional time is 4 hours (.5 conference, .5 demonstration, and 3 hours practical exercise [PMCS is integrated]).

TRAINING EVALUATION

OPERATE THE CRANE ON THE M977 HEMTT BY LOADING
AND OFF LOADING CARGO

NAME _____ RANK _____ UNIT _____

EVALUATOR _____ DATE _____

STEPS

PREPARE CRANE FOR USE:

1. STARTS ENGINE.

2. POSITIONS VEHICLE ON LEVEL GROUND SO ALL LOADING AND UNLOADING CAN BE DONE FROM ONE POSITION.

3. PUTS TRANSMISSION RANGE SELECTOR IN "N" POSITION AND PULLS PARKING BRAKE CONTROL KNOB OUT.

4. ENSURES PTO ENGAGE SWITCH IS IN OFF POSITION.

5. PUSHES SELECTOR VALVE IN FOR CRANE OPERATION (IF EQUIPPED WITH WINCH).

6. PUTS PTO ENGAGE SWITCH TO ON POSITION.

7. SETS ELECTRIC CONTROL BOX ON/OFF POWER SWITCH TO ON POSITION.

8. SETS ENGINE HIGH IDLE ON/OFF SWITCH TO ON POSITION.

9. PRESSES ENGINE HIGH IDLE LATCH BUTTON TO LATCH AND RELEASES TO RAISE ENGINE SPEED TO APPROXIMATELY 1,500 RPM.

SET UP OUTRIGGERS:

10. MOVES OUTRIGGER EXTENSION LEVER TO OUT POSITION UNTIL RIGHT AND LEFT OUTRIGGER BEAMS ARE COMPLETELY OUT.

11. REMOVES TWO SAFETY PINS AND OUTRIGGER PAD FROM STUDS ON OUTRIGGER BEAMS.

12. REMOVES TWO RETAINING PINS FROM OUTRIGGER PAD.

GO	NO-GO

<u>STEPS</u>		GO	NO-GO
13.	CLEANS ALL FOREIGN MATERIAL FROM SOCKET IN OUTRIGGER PAD AND FROM ROD END OF OUTRIGGER JACK CYLINDER.		
14.	POSITIONS OUTRIGGER PAD DIRECTLY BELOW OUTRIGGER JACK CYLINDER.		
15.	REPEATS STEPS 11 THROUGH 14 TO SET UP THE OUTRIGGER PAD ON THE OTHER SIDE.		
16.	MOVES LEFT OUTRIGGER JACK CONTROL LEVER TO DOWN POSITION AND LOWERS OUTRIGGER JACK CYLINDER UNTIL ROD END IS SEATED IN OUTRIGGER PAD.		
17.	INSTALLS RETAINING PINS IN OUTRIGGER PAD.		
18.	MOVES RIGHT OUTRIGGER JACK CONTROL LEVER TO DOWN POSITION AND LOWERS OUTRIGGER JACK CYLINDER UNTIL ROD END IS SEATED IN OUTRIGGER PAD.		
19.	INSTALLS RETAINING PINS IN OUTRIGGER PAD.		
20.	MOVES LEFT AND RIGHT OUTRIGGER JACK CONTROL LEVERS TO DOWN POSITION. LOWERS LEFT AND RIGHT OUTRIGGER JACK CYLINDERS UNTIL VEHICLE WEIGHT IS OFF SUSPENSION. EXTENDS JACKS INDIVIDUALLY AS NECESSARY TO LEVEL THE TRUCK SIDE TO SIDE.		
RAISE AND OPERATE CRANE:			
21.	MOVES HOIST CONTROL LEVER TO DOWN POSITION AND LOWERS HOIST CABLE APPROXIMATELY 12 INCHES.		
22.	DISCONNECTS LOAD HOOK FROM STOWAGE RING BRACKET.		
23.	OPERATES BOOM CONTROL LEVER IN UP POSITION UNTIL BOOM IS IN VERTICAL POSITION.		
24.	OPERATES MAST CONTROL LEVER IN UP POSITION UNTIL MAST CYLINDERS ARE FULLY RAISED AND BOOM IS IN A HORIZONTAL POSITION.		
OPERATE CRANE WITH REMOTE CONTROL UNIT:			
25.	URNS ON/OFF POWER SWITCH ON ELECTRIC CONTROL BOX TO OFF POSITION.		

<u>STEPS</u>		GO	NO-GO
26.	REMOVES REMOTE CONTROL UNIT AND CABLE FROM STOWAGE BOX.		
27.	REMOVES COVER FROM CABLE AND COVER FROM REMOTE CONTROL UNIT RECEPTACLE. CLEANS ANY DIRT OR WATER FROM RECEPTACLE.		
28.	CLEANS ANY DIRT OR WATER FROM FEMALE CONNECTOR.		
29.	CONNECTS FEMALE CONNECTOR TO REMOTE CONTROL UNIT RECEPTACLE.		
30.	REMOVES COVER FROM REMOTE CONTROL CONNECTOR OUTLET AT FORWARD OR REAR REMOTE CONTROL STATION AND CLEANS ANY DIRT OR WATER FROM OUTLET.		
31.	ENSURES ON/OFF/MHC-SHUTDOWN POWER SWITCH IS IN THE OFF POSITION.		
32.	CLEANS ANY DIRT OR WATER FROM REMOTE CONTROL CABLE PLUG AND CONNECTS PLUG TO REMOTE CONTROL CONNECTOR OUTLET.		
33.	PUTS THE REMOTE UNIT STRAP AROUND NECK AND OVER SHOULDERS TO WEAR REMOTE CONTROL UNIT.		
34.	URNS ON/OFF POWER SWITCH ON ELECTRIC CONTROL BOX TO ON POSITION.		
35.	URNS ON/OFF/MHC-SHUTDOWN POWER SWITCH ON REMOTE CONTROL UNIT TO ON POSITION AND OPERATES CRANE.		
36.	MAINTAINS CONTROL OF LOAD AT ALL TIMES.		
37.	OPERATES CONTROL LEVERS WITH LIGHT, EVEN PRESSURE.		
38.	KEEPS HOOK BLOCK AT LEAST 2 FEET FROM END OF BOOM.		
39.	DOES NOT LET CABLE BECOME SLACK.		
40.	CENTERS END OF BOOM DIRECTLY OVER LOAD.		
41.	DOES NOT DRAG LOAD SIDEWAYS ON GROUND.		

STEPS

DISCONNECT REMOTE CONTROL UNIT:

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| 42. | PUTS ON/OFF/MHC-SHUTDOWN POWER SWITCH ON REMOTE CONTROL UNIT TO OFF POSITION. |
| 43. | PUTS ON/OFF SWITCH ON ELECTRIC CONTROL BOX TO OFF POSITION. |
| 44. | DISCONNECTS CABLE PLUG FROM REMOTE CONTROL CONNECTOR OUTLET AND INSTALLS COVER ON OUTLET. |
| 45. | DISCONNECTS FEMALE CONNECTOR FROM REMOTE CONTROL UNIT RECEPTACLE AND INSTALLS COVER ON RECEPTACLE. |
| 46. | INSTALLS COVERS ON CABLE AND COILS CABLE. |
| 47. | PUTS REMOTE CONTROL UNIT AND CABLE IN STORAGE BOX. |

SHUT DOWN CRANE:

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| 48. | PUTS ON/OFF POWER SWITCH TO ON POSITION. |
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| 49. | MOVES THE TELESCOPE CONTROL LEVER TO IN POSITION TO PULL BOOM EXTENSIONS IN AND MOVES HOIST CONTROL LEVER TO UP POSITION TO REEL IN CABLE UNTIL BOOM EXTENSIONS ARE FULLY RETRACTED. |
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| 50. | OPERATES SWING CONTROL LEVER TO POSITION BOOM PARALLEL WITH THE OUTRIGGER BEAM ON RIGHT SIDE OF VEHICLE. |
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| 51. | MOVES MAST CONTROL LEVER TO DOWN POSITION TO LOWER MAST UNTIL MAST IS COMPLETELY FOLDED DOWN. |
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| 52. | MOVES BOOM CONTROL LEVER TO DOWN POSITION UNTIL THE BOOM COMES TO REST ON THE MAST REST PAD. |
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| 53. | CONNECTS LOAD HOOK TO STOWAGE RING BRACKET. |
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| 54. | MOVES HOIST CONTROL LEVER IN UP POSITION TO REMOVE SLACK FROM THE HOIST CABLE. |
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| 55. | REMOVES TWO RETAINING PINS FROM EACH OUTRIGGER PAD. |
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[illegible]

STEPS

STOW OUTRIGGERS:

56. MOVES LEFT AND RIGHT OUTRIGGER JACK CONTROL LEVERS TO UP POSITION TO RETRACT OUTRIGGER JACK CYLINDERS COMPLETELY.

57. INSTALLS TWO RETAINING PINS IN EACH OUTRIGGER PAD.

58. STOWS OUTRIGGER PADS ON OUTRIGGER BEAM STUDS.

59. INSTALLS SAFETY PINS THROUGH STUDS.

60. MOVES OUTRIGGER EXTENSION CONTROL LEVER TO IN POSITION TO RETRACT OUTRIGGER BEAMS COMPLETELY.

61. TURNS ENGINE HIGH IDLE ON/OFF SWITCH TO OFF POSITION.

62. TURNS ON/OFF POWER SWITCH TO OFF POSITION.

63. PUTS PTO ENGAGE SWITCH IN OFF POSITION.

64. SHUTS OFF ENGINE AND SECURES LOAD.

GO	NO-GO

LESSON TITLE: PERFORM SELF RECOVERY ON AN M977/M978 HEMTT USING THE WINCH

TASK NUMBER: 551-721-1390 (Perform Self Recovery on a HEMTT Using a Winch) and 551-721-1352 (Perform Vehicle Preventive Maintenance Checks and Services [PMCS])

A. TRAINING OBJECTIVE.

TASK: Perform self recovery on an M977/M978 HEMTT using the winch and operator PMCS on the winch.

CONDITION: Given instruction, suitable training area, suitable anchor, an M977/M978 HEMTT with operational winch and BII, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, and a requirement to inspect the truck winch according to the PMCS tables listed in TM 9-2320-279-10-1 and recover the vehicle.

STANDARDS: Recover the vehicle in the correct sequence so that it is free to move under its own power without causing damage to the vehicle or injury to personnel. Correct all faults within the operator's level of maintenance and record all others legibly on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404. You must perform this task as both the driver and assistant driver. Students will be graded on a GO/NO-GO basis. See enclosed training evaluation checklist.

B. INTERMEDIATE TRAINING.

Intermediate Training Objective 1

TASK: Perform self recovery on an M977/M978 HEMTT using the winch.

CONDITION: Given instruction, suitable training area, suitable anchor, an M977/M978 HEMTT with operational winch and BII, and a requirement to recover the vehicle.

STANDARDS: Recover the vehicle in the correct sequence so that it is free to move under its own power without causing damage to the vehicle or injury to personnel. You must perform this task as both the driver and assistant driver. Students will be graded on a GO/NO-GO basis. See enclosed training evaluation checklist.

Intermediate Training Objective 2

TASK: Perform operator PMCS on the M977/M978 HEMTT winch.

CONDITION: Given instruction, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, an M977/M978 HEMTT with BII, and a requirement to inspect the vehicle winch according to the PMCS tables listed in TM 9-2320-279-10-1.

STANDARDS: Correct all faults within the operator's level of maintenance and record all others legibly on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Classroom and training area as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for the conference, one assistant instructor for each six students for the demonstration, and one assistant instructor for each two students for the practical exercise.
6. Training aids and equipment: Television, VCR, and TVT 55-24. Hearing protection and work gloves are required for all personnel. DA Form 2404, pencil, rags, TM 9-2320-279-10-1, equipment records folder, a winch equipped HEMTT with BII, and anchor for every two students.
7. References: AR 385-55, DA Pamphlet 738-750, TM 9-2320-279-10-1, and FM 20-22.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures:
 - (1) Explanation.
 - (2) Practical exercise.
 - (3) Summary.
2. Explanation and demonstration:

NOTE: The classroom must be near the training area where recovery operations are to be practiced. This allows the student to view the videotape and put into practical application these self recovery procedures with a minimum loss of learned skills. Explain safety precautions and warnings, followed by the videotape, and then demonstrate PMCS of the winch and self recovery. PMCS on the winch is performed in conjunction with weekly winch operation.

- a. Explain all safety precautions for this exercise and review warnings. Attention should be drawn to all warnings in vehicle operator's manual with particular attention given the following:

Transparency HEMTT 5-1

WARNING

Always wear heavy gloves when handling the winch cable. Never let the moving cable slide through the hands, even when wearing gloves. A broken cable could cut through the glove and cut the hand severely.

WARNING

Never operate the winch with less than five wraps of cable on the winch drum. Serious injury or death could result if the cable comes off the drum while winching.

WARNING

Avoid quick, jerking winch operation. Keep other personnel well away from the vehicle involved in the winching operation. A snapped cable or shifting load can cause serious injury or death.

WARNING

Do not operate the winch while personnel are working on or around the tensioning device. Severe injury to arms, hands, and fingers may result if the cable moves while working with the cable and tensioning device.

WARNING

Keep all personnel clear of the area near the cable when tension is on the cable (at least one cable length away from and opposite the angle of pull). If the cable breaks, it can cause severe injury or death.

Transparency HEMTT 5-2

WARNING

Do not use the winch to reel the clevis end of the cable through the roller guides. The clevis may catch on the roller guide and cause the cable or roller guide to break. Broken cables or roller guides can cause serious injury or death.

WARNING

Keep all personnel clear of the winch area when the winch is reeling in the cable. If hands are caught in the winch or the cable, or if the cable breaks under tension, severe injury or death could occur.

WARNING

Do not reel in the cable too tightly. If too much tension is applied, the cable or tiedown ring can break causing severe injury to personnel.

- b. Show TVT 55-24.
- c. Demonstrate hand and arm signals required for this exercise.
- d. Demonstrate self recovery of a HEMTT to include winch PMCS.

NOTE: The HEMTT will be winched forward for this exercise. The students will also winch the vehicle forward. Winching the HEMTT rearward is similar.

3. Practical exercise:

- a. Assign students to vehicles and recovery location. Diagram of area for self recovery is at Figure 5-9. Issue work gloves to each student.
- b. Students practice self recovery of the HEMTT and winch PMCS. Ensure the students practice as both the driver and the assistant driver.

NOTE: Do not allow the students to perform any unsafe acts. Recovery operations must be closely supervised because of the potential for injury or death.

4. Evaluate: Check each student's performance of self recovery and winch PMCS as both the driver and assistant driver.

5. Summary:

- a. Recap main points.
- b. Allow for questions.
- c. Clarify questions.
- d. Closing statement.

6. Retraining: Retrain NO-GOs and slow learners. All students must receive a GO in all areas of the attached training evaluation checklist.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when vehicles are parked or maintenance is to be performed.

2. Ensure the transmission is in N, the parking brake is set, and the engine is shut off before leaving the vehicle, when the vehicle is parked, or maintenance is being performed.

3. Ensure all personnel remove all wristwatches, rings, bracelets, neck chains, and any other jewelry before working in or around the HEMTT.

4. Ensure all personnel pay particular attention to the cautions and warnings listed in the operator's manuals.

5. Ensure the driver and ground guides know and understand the hand and arm signals, especially the signal to stop, as outlined in FM 21-305.

6. Ensure ground guide(s) are used when backing.

7. Ensure all backing is conducted at a speed of 5 MPH or less.

8. Do not park the vehicle on a steep grade. Serious injury or death can result or the vent on the M978 tanker may leak.

9. Ensure all personnel wear hearing protection when working in or around a running HEMTT.

10. Ensure all occupants wear seat belts while the vehicle is in operation.

11. Ensure personnel maintain at least three points of contact when mounting or dismounting the vehicle (to include performing PMCS).

12. The vehicle access ladder must be used when performing maintenance. The two hooks on the ladder must be installed in the front skid plate holes, right front fender holes, or left front fender holes as required. When installing the access ladder on the right front fender, do not hit the fuel-water separator. Hitting the fuel-water separator could cause the glass to break.

13. Ensure all personnel are clear of vehicle before engine start is attempted. Operator must visually check to see that all areas of the vehicle are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.

14. Always wear heavy leather palmed work gloves when handling the winch cable. Never let the moving cable slide through the hands, even when wearing gloves. Winch cable can become frayed or contain broken wires. Frayed or broken wires can cut through gloves and cut hands.

15. Never walk between the vehicle and anchor.

16. The driver must have a clear view of the assistant driver at all times.

17. Do not bend the winch cable at sharp angles.

18. Do not operate the winch while personnel are working on or around the cable guides or tensioning device. Severe injury to arms, hands, and fingers may result if the cable moves while working with the cable and the cable guides or tensioning device.

19. Keep all personnel clear of the winch area when the winch is reeling in the cable. If hands are caught in the winch or the cable, or if the cable breaks under tension, severe injury or death could occur.

20. Keep all personnel clear of the area near the cable when tension is on the cable (at least one cable length away from and opposite the angle of pull). If the cable breaks, it can cause severe injury or death.

21. Avoid quick, jerking winch operation. Keep other personnel well away from the vehicle involved in the winching operation. A snapped cable or shifting load can cause serious injury or death.

22. Do not use the winch to reel the clevis end of the winch cable through the roller guides. The clevis may catch on the roller guides and cause the cable or roller guides to break. Broken cables or roller guides can cause serious injury or death.

23. Do not reel in the winch cable too tightly. If too much tension is applied, the cable or tiedown ring can break causing severe injury to personnel.

24. Never operate the winch with less than five wraps of cable on the winch drum. If a load is applied with less than five wraps of cable on the winch, the cable may come loose on the drum.

25. When attaching the self recovery winch cable to another vehicle, that vehicle must be used only as an anchor point or damage to equipment may result.

26. The self recovery winch is not designed to winch the mired vehicle by itself. Vehicle drive system power must always be used with the winch to self recover the vehicle, or damage to equipment can result.

27. If the winch does not move the vehicle, stop using the winch. Overheating damage may occur.

28. Keep the winch cable tight at all times so the cable does not get tangled with the vehicle.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (.5 conference, .5 demonstration, and 3 hours practical exercise [PMCS is integrated]).

TRAINING EVALUATION

PERFORM SELF RECOVERY ON A HEMTT, USING THE VEHICLE
MOUNTED WINCH (FORWARD)

NAME _____ RANK _____ UNIT _____

EVALUATOR _____ DATE _____

AS DRIVER

AS ASSISTANT DRIVER

STEPS	STEPS	GO	NO-GO
1. SHUTS OFF ENGINE.	NA		
2. ADJUSTS PASSENGER MIRROR SO DRIVER CAN SEE PASSENGER AT REAR OF VEHICLE.	ADJUSTS PASSENGER MIRROR SO DRIVER CAN SEE PASSENGER AT REAR OF VEHICLE.		
3. ENSURES PTO ENGAGE SWITCH IS IN THE OFF POSITION.	NA		
4. NA	PULLS THE SELECTOR VALVE CONTROL OUT.		
5. STARTS ENGINE.	NA		
6. CHECKS THAT TRANSMISSION RANGE SELECTOR IS SET TO N.	NA		
7. SETS PTO ENGAGE SWITCH TO ON.	NA		
8. MOVES WINCH SHIFT LEVER TO OUT POSITION TO PAY OUT SMALL AMOUNT OF CABLE.	NA		
9. SETS THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		
10. SETS THE PTO ENGAGE SWITCH TO OFF.	NA		

AS DRIVER	AS ASSISTANT DRIVER		
STEPS	STEPS	GO	NO-GO
11. NA	REMOVES THE COTTER PIN FROM THE CLEVIS PIN.		
12. NA	REMOVES THE PIN FROM THE CLEVIS AND DISCONNECTS THE CLEVIS FROM THE TIEDOWN RING.		
13. NA	REINSTALLS THE PIN IN THE CLEVIS WITH THE COTTER PIN.		
14. NA	PULLS THE WINCH CABLE UNDER THE WINCH AND UP ALONG THE FRONT FACE OF THE WINCH TOWARDS THE FRONT OF THE VEHICLE.		
15. SETS THE PTO ENGAGE SWITCH TO ON.	NA		
16. MOVES THE WINCH SHIFT LEVER TO OUT AND LETS OUT SOME CABLE.	ROUTES THE CABLE THROUGH THE NOTCH IN THE FENDER AND CONTINUES TO ROUTE CABLE ABOVE TENSIONING DEVICE PULLEYS.		
17. CONTINUES TO LET OUT THE WINCH CABLE.	AT CABLE GUIDE, MOVES SHEAVE TOWARDS VEHICLE FRAME AND HOLDS IN POSITION. ROUTES WINCH CABLE THROUGH CABLE GUIDE. CABLE MUST BE BETWEEN TWO ROLLERS. ALLOWS SHEAVE TO MOVE BACK TOWARDS WINCH CABLE. LIFTS UP ON WINCH CABLE AND PLACES IN GROOVE OF SHEAVE.		
18. CONTINUES TO LET OUT MORE WINCH CABLE.	ROUTES THE CABLE OVER THE FIRST AXLE AND ONE FOOT PAST THE FRONT ROLLER GUIDE ASSEMBLY.		

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AS DRIVER	AS ASSISTANT DRIVER		
STEPS	STEPS	GO	NO-GO
19. SETS THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		
20. SETS THE PTO ENGAGE SWITCH TO OFF.	NA		
21. NA	REMOVES THE QUICK RELEASE PIN AND BRACKET. MOVES CABLE GUIDE BRACKETS APART.		
22. NA	PLACES THE WINCH CABLE AGAINST BOTTOM OF SHEAVE. ROUTES WINCH CABLE UNDER SHEAVE. MOVES CABLE GUIDE BRACKETS TOGETHER.		
23. NA	REINSTALLS THE GUIDE BRACKET AND QUICK RELEASE PIN.		
24. SETS THE PTO ENGAGE SWITCH TO ON.	NA		
25. MOVES THE WINCH SHIFT LEVER TO OUT AND LETS OUT THE WINCH CABLE.	PULLS THE CABLE TO A TREE, ANOTHER HEAVY VEHICLE, OR SOME OTHER STATIONARY HEAVY OBJECT.		
26. WHEN THE WINCH CABLE IS LET OUT TO THE HEAVY OBJECT, SETS THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		
27. SETS THE PTO ENGAGE SWITCH TO OFF.	NA		
28. NA	ATTACHES THE CABLE TO ANCHOR POINT (SUCH AS A TREE).		

AS DRIVER	AS ASSISTANT DRIVER		
STEPS	STEPS	GO	NO-GO
29. NA	CHECKS WINCH CABLE FOR BROKEN WIRES AND KINKS.		
30. ENSURES THE WINCH SHIFT LEVER IS SET AT THE CENTER POSITION AND THE PTO ENGAGE SWITCH IS SET TO OFF.	CHECKS TO SEE THAT THERE ARE AT LEAST FIVE WRAPS OF WINCH CABLE LEFT ON THE DRUM.		
31. NA	PULLS BACK AND HOLDS THE TENSION PULLEY LEVER ON CABLE GUIDE. PUTS THE WINCH CABLE BETWEEN TENSIONING DEVICE PULLEYS. RELEASES THE TENSION PULLEY LEVER.		
32. NA	CHECKS THAT THE WINCH CABLE RESTS INSIDE GROOVES OF TENSIONING DEVICE PULLEYS AND SHEAVE.		
33. NA	CHECKS THAT WINCH CABLE IS NOT CAUGHT ON THE VEHICLE OR ANY OTHER OBJECTS.		
34. ENSURES THAT ALL PERSONNEL ARE CLEAR OF THE WINCH AND THE WINCH CABLE.	TAKES COVER IN A PROTECTED AREA AWAY FROM THE WINCH AND THE WINCH CABLE.		
35. SETS THE PTO ENGAGE SWITCH TO ON.	NA		
36. MOVES THE WINCH SHIFT LEVER TO IN UNTIL THE SLACK IS OUT OF THE CABLE.	NA		
37. MOVES THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		

AS DRIVER	AS ASSISTANT DRIVER		
STEPS	STEPS	GO	NO-GO
38. ENSURES THE TRANSFER CASE SHIFT LEVER IS SET TO THE LO POSITION.	NA		
39. CHECKS THAT THE TRACTION CONTROL LEVER IS SET TO INTER-AXLE DIFF. LOCK.	NA		
40. PRESSES SERVICE BRAKE PEDAL.	NA		
41. SETS THE TRANSMISSION RANGE SELECTOR TO 1.	NA		
42. RELEASES THE PARKING BRAKE.	NA		
43. RELEASES THE SERVICE BRAKE PEDAL.	NA		
44. MOVES THE WINCH SHIFT LEVER TO IN AND APPLIES SLIGHT PRESSURE TO THE ACCELERATOR PEDAL.	NA		
45. ADJUSTS THE POSITION OF THE ACCELERATOR PEDAL TO CHANGE THE ENGINE SPEED AS NEEDED TO KEEP THE WINCH CABLE TIGHT AND THE VEHICLE MOVING.	NA		
46. WHEN THE VEHICLE IS ON SOLID GROUND, SETS THE WINCH SHIFT LEVER TO THE CENTER POSITION, SETS THE PARKING BRAKE, AND SHIFTS THE TRANSMISSION RANGE SELECTOR TO N.	NA		

AS DRIVER	AS ASSISTANT DRIVER		
STEPS	STEPS	GO	NO-GO
47. AFTER RECOVERY, SETS THE WINCH SHIFT LEVER TO OUT AND LETS OUT ENOUGH WINCH CABLE UNTIL ALL TENSION IS OFF THE CABLE.	NA		
48. SETS THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		
49. SETS THE PTO ENGAGE SWITCH TO OFF.	NA		
50. NA	ENSURES THERE IS ENOUGH SLACK IN WINCH CABLE AND DISCONNECTS WINCH CABLE FROM ANCHOR POINT (SUCH AS A TREE).		
51. SETS THE PTO ENGAGE SWITCH TO ON.	NA		
52. SETS THE WINCH SHIFT LEVER TO IN.	NA		
53. REELS IN WINCH CABLE.	USES A TIRE IRON HANDLE TO GUIDE THE WINCH CABLE ONTO THE WINCH SO THE CABLE WRAPS ARE LEVEL ACROSS THE FACE OF THE WINCH DRUM.		
54. WHEN THE END OF THE CABLE IS NEAR THE FRONT OF THE VEHICLE, MOVES THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		
55. SETS THE PTO ENGAGE SWITCH TO OFF.	NA		

AS DRIVER	AS ASSISTANT DRIVER		
STEPS	STEPS	GO	NO-GO
56. NA	REMOVES THE QUICK RELEASE PIN AND GUIDE BRACKET. MOVES THE CABLE GUIDE BRACKETS APART SO WINCH CABLE CAN BE REMOVED. BY HAND, REMOVES THE WINCH CABLE FROM THE SHEAVE.		
57. NA	MOVES THE CABLE GUIDE BRACKETS BACK TOGETHER. INSTALLS THE GUIDE BRACKET AND THE QUICK RELEASE PIN.		
58. SETS THE PTO ENGAGE SWITCH TO ON AND THE WINCH SHIFT LEVER TO IN.	NA		
59. SLOWLY REELS IN THE WINCH CABLE UNTIL THE END OF WINCH CABLE IS APPROXIMATELY 1 FOOT FROM THE TENSIONING DEVICE.	USES A TIRE IRON HANDLE TO GUIDE THE WINCH CABLE ONTO THE WINCH SO THE CABLE WRAPS ARE LEVEL ACROSS THE FACE OF THE WINCH DRUM.		
60. MOVES THE WINCH SHIFT LEVER TO THE CENTER POSITION AND THE PTO ENGAGE SWITCH TO OFF.	NA		
61. NA	PULLS BACK AND HOLDS THE TENSION PULLEY LEVER.		
62. NA	LIFTS THE WINCH CABLE OUT OF THE GROOVES OF THE TENSIONING DEVICE PULLEYS AND OFF OF THE SHEAVE.		
63. NA	RELEASES THE TENSION PULLEY LEVER.		

AS DRIVER	AS ASSISTANT DRIVER		
STEPS	STEPS	GO	NO-GO
64. NA	PHYSICALLY (BY HAND) PULLS THE WINCH CABLE BACK AND OUT OF THE CABLE GUIDE.		
65. SETS THE PTO ENGAGE SWITCH TO ON AND THE WINCH SHIFT LEVER TO IN.	NA		
66. REELS IN THE WINCH CABLE SLOWLY UNTIL THE CLEVIS IS APPROXIMATELY 2 FEET FROM THE WINCH. MOVES THE WINCH SHIFT LEVER TO THE CENTER POSITION AND THE PTO ENGAGE SWITCH TO OFF.	GUIDES THE WINCH CABLE ONTO THE WINCH; BEING CAREFUL THAT THE END OF THE CABLE DOES NOT GET CAUGHT ON THE NOTCH IN THE FENDER.		
67. NA	ROUTES THE END OF THE WINCH CABLE DOWN ALONG THE FRONT FACE OF THE WINCH, UNDER THE WINCH, AND OUT THROUGH THE HOLE IN THE BOTTOM OF THE REAR WINCH FRAME.		
68. NA	CONNECTS THE CLEVIS TO THE TIEDOWN RING WITH THE PIN AND THE COTTER PIN.		
69. SETS THE PTO ENGAGE SWITCH TO ON.	NA		
70. HAS EVERYONE STAND CLEAR OF THE AREA NEAR THE WINCH, SETS THE WINCH SHIFT LEVER TO IN, AND TAKES ALL THE SLACK OUT OF THE CABLE.	STANDS CLEAR OF THE IMMEDIATE AREA NEAR THE WINCH. WHEN THE CABLE IS TIGHT, SIGNALS THE DRIVER TO STOP.		

AS DRIVER	AS ASSISTANT DRIVER		
STEPS	STEPS	GO	NO-GO
71. MOVES THE WINCH SHIFT LEVER TO THE CENTER POSITION, SETS THE PTO ENGAGE SWITCH TO OFF, AND SHUTS THE ENGINE OFF.	NA		
72. NA	PUSHES IN THE SELECTOR VALVE CONTROL.		
73. NA	STOWS ALL BII USED DURING WINCHING.		
74. ADJUSTS MIRROR FOR DRIVING.	ADJUSTS MIRROR FOR DRIVING.		